

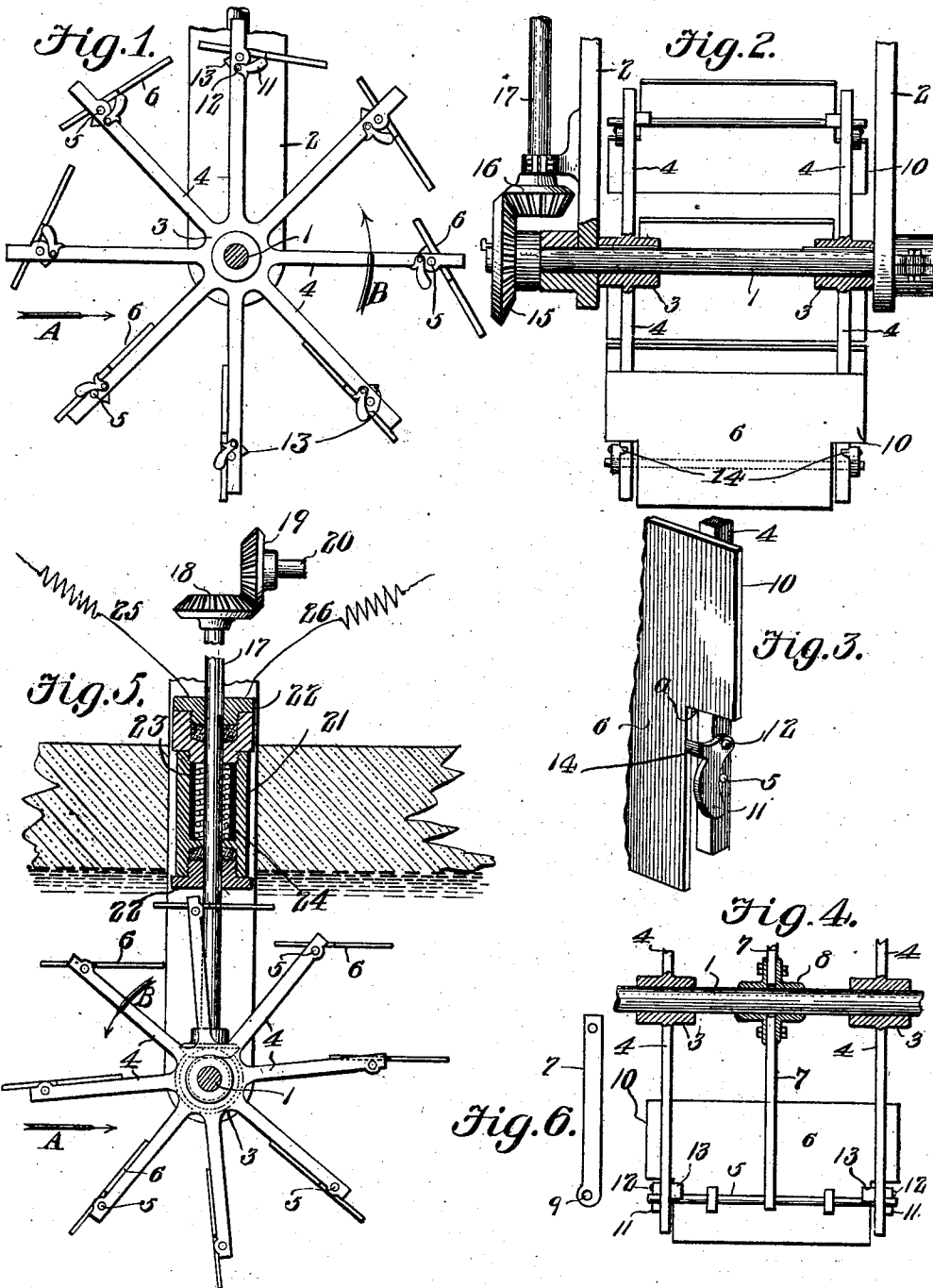
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No. 857,482.

PATENTED JUNE 18, 1907.

A. H. PERRY.
WATER WHEEL.

APPLICATION FILED DEC. 29, 1905.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALONZO HIRAM PERRY, OF KINLOCH PARK, MISSOURI.

WATER-WHEEL.

No. 857,482.

Specification of Letters Patent.

Patented June 18, 1907.

Application filed December 29, 1905. Serial No. 293,804.

To all whom it may concern:

Be it known that I, ALONZO HIRAM PERRY, a citizen of the United States, residing at Kinloch Park, in the county of St. Louis and State of Missouri, have invented a new and useful Water-Wheel, of which the following is a specification.

This invention relates to water wheels, and is designed to provide for effectually feathering the blades of the wheel, and to enable the effective running of the wheel partly submerged and also wholly submerged.

A further object of the invention is to prevent choking of the power shaft by ice when the wheel is submerged.

With these and other objects in view, the present invention consists in the combination and arrangement of parts as will be hereinafter more fully described, shown in the accompanying drawing and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

Figure 1 is a side elevation of a water wheel embodying the features of the present invention, one of the shaft hangers being removed and the wheel shown partially submerged. Fig. 2 is a cross sectional view of the wheel. Fig. 3 is a fragmentary perspective view showing the relation between one end of a paddle and the adjacent pivotal support therefor. Fig. 4 is an elevation showing one of the paddles on the opposite side of the adjacent arms of the wheel. Fig. 5 is a side elevation of the wheel submerged, parts being broken away to disclose an electric heater for preventing accumulation of ice around the power shaft. Fig. 6 is a detail view of one of the supplemental arms of the wheel.

Similar numerals of reference designate corresponding parts in all of the figures of the drawing.

As embraced in Figs. 1 and 2 of the drawing, the present wheel is mounted upon a horizontal shaft 1, which is in turn supported by and between a pair of hangers 2. The wheel itself includes a pair of spaced hubs 3 from each of which radiate arms 4. Each pair of corresponding arms of the two hubs is connected by a cross bar 5 located inwardly from the outer ends of the arms, and upon which is pivotally supported a paddle

6. A supplemental arm 7 is secured to a central hub 8 carried by the shaft 1 and has its outer end provided with an eye or opening 9 through which the cross bar 5 extends. Each paddle is pivotally supported or swung upon the adjacent cross bar 5 at a point about one-third of the distance from one of its transverse edges. That portion of the paddle which is adjacent the cross bar 5 is of a length to work between adjacent arms 4, while the other portion of the paddle has end extensions 10 designed to overlap the arms and engage the latter as supports to limit rotation of the paddle in one direction. Upon the outer side of each arm 4 is a swinging member 11 terminally pivoted as at 12, upon the outer side of the arm inwardly from the adjacent cross bar 5, said member being provided with a lateral extension or shoulder 14 to engage one of the edges of the arm and limit rotation of the member 11 in one direction.

In practice, the wheel is mounted so as to be about one-half submerged, as in Fig. 1, whereby the paddles or blades assume the various positions illustrated in this figure of the drawing. The direction of the current is indicated by the arrow "A," and the direction of the rotation of the wheel is indicated by the arrow "B," wherefore the paddles of the right hand side of the wheel are ascending. Beginning with the uppermost paddle, it will be noted that it is supported in a substantially horizontal position by having its longer end portion supported upon the pivotal prop 11, there being one of such props at each side of the paddle. As the paddle moves to the left and downwardly it is supported in a position inclined downwardly and toward the direction from which the stream is flowing until its lower shorter end dips into the stream, whereupon the lower end will be swung back toward and against the stop 13, whereupon the swinging prop 11 will clear the back of the paddle and drop down through the notch *a* formed in the adjacent edge of the paddle. As the lower shorter end of the paddle enters the stream, it will be subjected to the pressure thereof and be held against the shoulder 13 until the pivotal axis of the blade enters the stream, and as the paddle continues to descend, the pressure of the water upon the greater area of the paddle above its pivotal axis will swing the upper end portion of the paddle inwardly against the arms until the paddle assumes a substan-

tially horizontal position at the other side of the wheel, when the current acting upon the upper side of the paddle will swing the same downwardly as the paddle rises from the stream. After the paddle reverses its position at the right hand side of the wheel, the upper end portion of the paddle will be held against the adjacent stop 13 so as to support the paddle in position to be acted upon by the current. Just as soon as the paddle emerges from the water, it will drop back against the adjacent prop 11 and be supported thereby until it reaches a vertical position at the opposite left hand side of the wheel, when the operation of the paddle will continue in a manner hereinbefore described.

A very important feature of the present invention will be understood from the fact that the paddles are automatically feathered by gravity and by the force of the stream, wherefore extraneous feathering means is dispensed-with and the wheel is materially simplified while its effectiveness is preserved and increased.

Power is transferred from the shaft 1 by means of a beveled gear 15 upon either end of the shaft, said gear being in mesh with another gear 16 upon an upright shaft 17, the latter being provided, as in Fig. 5, with a gear 18 in mesh with a gear 19 carried by a shaft 20, from which power is taken in any suitable manner and for any desired purpose, preferably for running an electric generator. In lieu of shafts and gears, belts and pulleys may be employed to transfer power from the shaft 1.

When the wheel is entirely submerged, as in Fig. 5 of the drawing, the pivotal props 11 and stationary stops 13 are removed, and the blades are automatically feathered by the force of the current. When the wheel is submerged, the upright shaft 17 is liable to become choked when the surface of the stream becomes frozen over, and therefore I propose to provide for preventing freezing of the water around the shaft, one embodiment of my idea being disclosed in Fig. 5. In carrying out this feature of the invention, a tubular shell or case 21 is placed upon the shaft so as to extend a suitable distance above and below the surface of the water, the ends of the case being equipped with suitable packing boxes 22 to prevent leakage of the water into the case. The interior of the case is lined with asbestos or other suitable material 23, and an electric conductor 24 is loosely coiled around the shaft within the case, from which its terminals 25 and 26 extend to a suitable source of electrical energy, whereby the coil 24 is maintained in a charged and heated condition sufficient to prevent freezing of the water around the shaft. When the water wheel is employed for driving an electric generator, the heating coil 24 is of

course connected with such generator, otherwise it may connect with any available electric service.

In each application of the wheel, whether entirely submerged or only partially submerged, it will be noted that the form and mounting of the paddles are the same. Each paddle has a short portion which is pivoted upon the cross-bar 5 and works between the arms 4, while the long portion which carries the extensions 10 exceeds the length of the space between opposite arms 4, so as to lap and lie against the arms in certain positions so as to receive the force of the current and thereby rotate the wheel. When partially submerged as in Figs. 1 and 2, each paddle is active to impart rotary movement to the wheel during its entire path through the stream. Whereas, when the wheel is entirely submerged the paddles are active to produce rotation of the wheel only during the lower half of the path of movement. When the paddles of the submerged wheel are passing through the upper half of the path of the wheel, they trail from their pivotal supports 5 and do not tend to rotate the wheel. In other words, with the wheel rotating in the direction of the arrow, shown in Fig. 5, each paddle begins to become active just after it passes downwardly beyond the horizontal at the left hand side of the wheel, its activity increasing until it assumes a vertical position, and then decreases until it passes above the horizontal, whereupon the paddle will be inverted by the force of the current on account of the tendency of the paddle to trail, due to the fact that it is pivotally supported nearer one end than the other.

Having thus described the invention, what is claimed is:—

1. A water wheel including radial arms, paddles pivotally mounted on the arms each on an axis located intermediate the middle and one side of the paddle, gravity actuated devices mounted on the arms for permitting the paddles to move to and from a feathering position during the period they are out of the water, and stops on the arms which are arranged to be engaged by the paddles as the latter enter the water and to be disengaged as soon as the paddles become completely submerged.

2. A water wheel including radial arms, paddles pivotally supported thereon between the arms and each on an axis intermediate its horizontal edges and having end extensions arranged to overlap and abut the arms while the paddle is submerged, pivotal paddle-engaging props carried by the arms and limited in their swinging movements in one direction, each prop capable of gravitating from the adjacent paddle when the latter approaches the water, and stops carried by the arms for engagement by the respective pad-

dles when the props disengage therefrom and only during the time required to completely submerge each paddle.

3. A water wheel having feathering paddles adapted to become radial by folding inward, each paddle being pivotally supported intermediate of its ends, means to prevent the paddle from folding when out of the water and capable of releasing the paddles when the latter enter the water, and means to hold the paddles against folding when they first enter the water until they become submerged below their pivotal axes.

4. A water wheel including radial arms, paddles pivotally supported thereon and capable of folding inwardly, means to prevent the paddles folding when out of the water, each paddle being pivotally supported intermediate of its ends and adapted to enter the water in an upright position, and stops carried by the under sides of the arms for engagement with the lower end portions of the paddles when entering the water to prevent rotation of the paddles until after their pivotal axes becomes submerged.

5. A water wheel having radial arms, a series of paddles adapted to fold radially inward and pivotally supported at one side of their middles, means to prevent the paddles folding when out of the water, said means capable of disengaging the paddles to free the same when entering the water, stops carried by the arms for engagement by the rear sides of the lower shorter end portions of the paddles when entering the water to prevent folding thereof, said paddles being free to fold radially inward after their axes have become submerged.

6. A water wheel comprising two sets of

radial arms, a series of paddles, each paddle working between and pivotally supported by corresponding arms, the pivotal support being located at one side of the middle of the paddle and the other side of the paddle having end extensions to overlap and lie against the arms as a support, pivotal props carried by the arms for engagement with the extended portions of the paddles to prevent folding of the paddles when out of the water and capable of gravitating out of engagement with the paddles when the latter enter the water, each paddle being disposed to have its short end enter the water first, and stops carried by the arms for engagement by the short ends of the paddles when entering the water to prevent folding of the paddles by the pressure of the water until the paddles become submerged below their pivotal axes.

7. A water wheel having an upright submerged shaft, a closure around the shaft at the water level, and a thermal device within the closure to prevent accumulation of ice around the shaft.

8. A water wheel having an upright submerged shaft, and an electric heater to prevent accumulation of ice around the shaft.

9. A water wheel having an upright submerged shaft, a case embracing the submerged portion of the shaft, and an electric heating coil contained within the case.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ALONZO HIRAM PERRY.

Witnesses:

HENRY G. BOESING,
CALVIN L. THOMAS.